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The home lawn

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COVER ILLUSTRATION

A beautiful couch lawn at Strathfield Council
Chambers.—Photo: G. Bolton

The home lawn, usually the largest part of the garden, provides a place for play and relaxation. It also protects and insulates the soil, absorbs the impact of rain that is so destructive on unprotected soil, and allows the water to seep down to where it is needed.

Lawns as we know them are a direct development from the grass bowling alleys of Tudor England. They became popular with the invention of the lawn-mower in 1830.

Lawns are made from thousands of individual grass plants growing very close together, sometimes connected by runners, and cut short frequently.

In nature grasses grow further apart and, as they grow, the top parts are usually eaten by grazing animals. Grasses have evolved to survive close grazing and we make use of this when we mow the lawn.

Grazing animals return what they have eaten to the soil in dung, which promotes new growth. The lawn-mower doesn't return anything unless the catcher is left off, so there can be a gradual loss of nutrients from the soil. To replace them in the home lawn, fertiliser is needed.

With reasonable attention to mowing, watering, fertilising and weed control, you can have a magnificent home lawn.

SELECTION OF LAWN TYPE

Before doing any ground preparation, think about the type of lawn you want. Planning at this stage can prevent problems later on. (Remember that lawns are just one form of ground cover but are the hardest wearing and the most common.)

Choose your lawn type on the basis of appearance, uses it will be put to and the climate of your area.

Appearance. Consider whether you want a coarse lawn like Buffalo or a fine lawn like couch.

You can have several types of grass in a lawn if the appearance does not bother you. On some bush blocks native grasses and other small plants can be used and may well be the best ground cover for that area.

Consider what the lawn will be used for—whether it will be for lying on, walking and playing on or simply to look at. If it is for lying on you need a soft grass, but if it is for playing on you need a grass that can tolerate wear.

Climate. The climate of the area you live in affects the type of lawn you can grow successfully. The map of New South Wales (see page 4) shows lawn recommendations for each region.

There are two types of lawn grasses:

- warm climate grasses
- cool climate grasses.

WARM CLIMATE GRASSES

Buffalo

Originally from the West Indies, Buffalo (*Stenotaphrum secundatum*) got its name in Australia from the ship that brought it here, the *Buffalo*. It produces a thick, strong lawn that is spongy to walk on. It needs less fertiliser than other lawn types (but will probably be lusher and more wear resistant if fertilised). As it is a creeping grass the edges get into garden beds, but it is easier to keep out than Kikuyu and couch. If you prefer a finer, bowling green type of lawn you would find Buffalo too coarse and spongy. Like all lawn grasses it will not withstand heavy wear, though fertilising should help.

The leaf blades of Buffalo grass have minute sharp hairs which can cause minor skin irritation.

Buffalo is well suited to Sydney and suitable for all areas in the State except the tablelands. It does well on sandy soils near the coast.

Buffalo grows well in summer without growing too fast, and survives well in winter in regions

Table 1. Main differences between warm climate grasses and cool climate grasses

Warm climate grasses

Examples—Buffalo, Kikuyu and couch

- Grow well during warm months
- More drought resistant
- Make little or no growth during winter where frosts occur
- May lose colour in winter
- Produce vigorous runners that can invade garden beds
- Established mostly from turf or runners, though some types can be grown from seed
- Once established will normally last indefinitely
- Are suited to all areas of the State except the tablelands—that is the coast, western slopes and plains

Cool climate grasses

Examples—Kentucky Blue grass, Fine Rye grasses, Fescues and Bents

- Grow well during autumn and spring
- Less drought resistant
- Frost and cold resistant (to a point)
- Will remain green throughout the year
- Not generally invasive
- Established mostly from seed
- Will need to be re-seeded after several years as the lawn tends to thin out
- Are suited to the colder tableland areas of the State

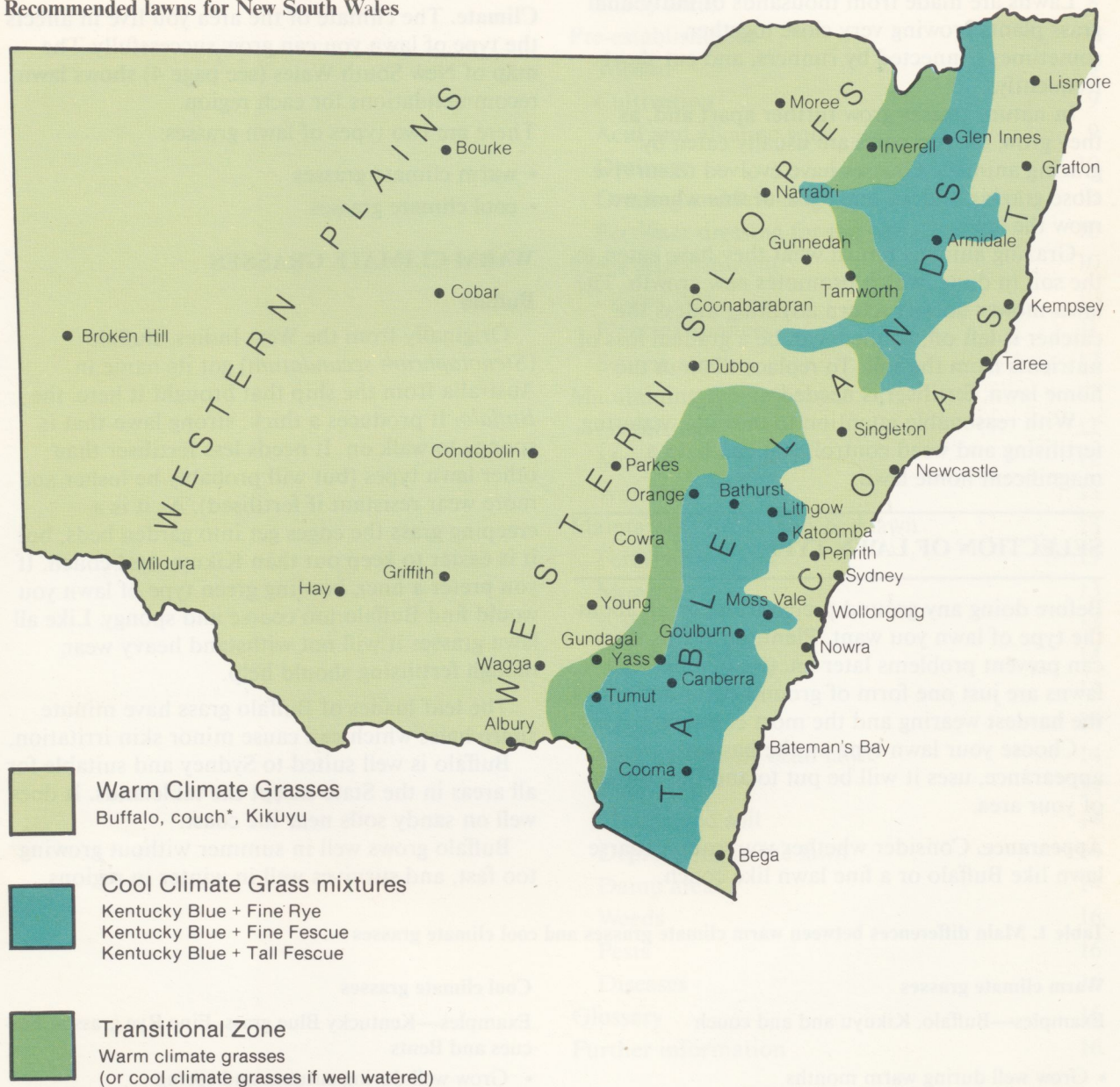
where frosts are not too severe, taking on a slight purple tinge as the cold sets in. It will not do well in the colder mountainous tablelands. It prefers full sun, but is moderately shade tolerant.

Establishment is by turf or runners; seed is not available. The turf is about three times the price of its main alternatives, couch and Kikuyu. A cheaper but slower method of establishment is to buy a smaller quantity of turf, tease out the

runners and plant them. Alternatively, get runners from neighbours trimming their edges.

Once Buffalo is well established it resists invasion by other grasses and weeds better than any other lawn type, as long as the mowing height is kept up. Some green leaf blade must always be left when mowing. Runners should not be exposed as the grass will die back and take a long time to recover, and weeds will take their place.

Recommended lawns for New South Wales



*see text for varieties of couch in different areas.

Divisions derived from R. H. Anderson's 'Trees of N.S.W.' Reproduced with permission of the Director, Royal Botanic Gardens, Sydney.

Transitional zone

Both warm and cool climate grasses can be grown in the transitional zone. Warm climate grasses survive well and look good in the warm months, but they brown-off in winter. Cool climate grasses can be grown if they get plenty of water during dry spells. They can look superb, especially in winter when they stay green.

If for any reason (for example, water restrictions) they will not get plenty of water, a warm climate grass is better. In fact, the above is true for all of the western slopes.



Buffalo grass. Note the strong runner and tough leaf blades.

Couch

Couch (*Cynodon dactylon*) is a fine-leaved lawn grass suitable for coastal and inland districts. It grows successfully on a wide range of soil types and withstands dry conditions well. Its main advantage is that it can be cut low to produce a finer lawn.

(Take in Photo 3—Couch grass—near here)

Weeds invade couch lawns more readily than Buffalo or Kikuyu lawns. Couch itself is notorious for invading garden beds and rockeries. Establishment is by runners, turf or seed. Shade tolerance is very poor.

Couch needs more fertiliser than Buffalo or Kikuyu because it forms a less dense type of lawn and is less competitive.

Common couch is the variety most often used in the home garden. Its seed is Arizona Common couch which makes a poor quality lawn because it tends to grow upright rather than flat.

Common couch will brown-off during winter in districts where frosts occur, but in most coastal districts it is green for at least 8 months of the year. An improved strain of Common couch, called 'Wintergreen', retains colour under heavy frost.

Better quality couches are available, and they come in two types:

- Improved Common couches—'Greenlees Park' and 'Wintergreen'. 'Greenlees Park' is the more usual.



Couch grass. Note the fine leaf blades.

- Hybrid types—'Santa Ana', 'Tifdwarf' and 'Tifway'.

The improved Common types are more suitable for the home lawn. The hybrids need more maintenance (fertilising, mowing and so on).

Establishment of these higher quality couches is by turf or runners only as seed is not available.

South African couch (*Cynodon transvaalensis*) is a fine couch that is recommended for the western slopes (see map). It can also be used in the tablelands where it goes dormant in winter but survives well.

Kikuyu

Kikuyu (*Pennisetum clandestinum*), a broad-leaved grass from Kenya, makes a lush green lawn which is very soft to sit on. It grows very vigorously in warmer months, demanding frequent mowing and tends to invade garden beds. Kikuyu thrives on a wide range of soil types and, unless frosts are particularly severe, will retain some colour throughout winter.

Establishment is best by turf or runners. Seed can also be used, but it should be avoided. Seed varieties, which were developed as pasture grasses, have major disadvantages as lawn grasses: they have an upright growth habit and tend to form a thin lawn, which allows easy weed invasion; they do not like being mowed; they set fertile seed that can be wind blown into other parts of the garden where grass is not wanted; and the white seed



Kikuyu grass – an extremely fast grower with soft leaf blades

heads, which give the appearance of a lawn covered in snow in summer, cannot be cut off by the mower. The Kikuyu sold as turf by reputable companies is better for home lawns because the seed produced is mostly non-fertile. Kikuyu tolerates dry conditions. Shade tolerance is medium.

In many areas Kikuyu gets a disease called 'Kikuyu yellows', which makes it a poor choice. The disease occurs in coastal New South Wales from the Queensland border to the Hunter, in the North-Western Slopes and in the lower Western Division. The Kikuyu strain Noonan is resistant to the disease and can be used to regenerate dead patches in the lawn.

Queensland Blue couch

As its name implies, Queensland Blue couch (*Digitaria didactyla*) grows well in warm climates such as Queensland. It is in a different group of grasses from Common couch, but resembles it. The leaves are ovate as opposed to the dagger shape of Common couch and have a bluish colour. Blue couch makes an excellent lawn, particularly on the north and central coast but it will not tolerate wear. It is better in humid conditions than Common couch, but doesn't tolerate heavy frost. Establishment is by seed, runners or turf. Shade tolerance is moderate.

Note: If warm climate grasses are used in tableland areas that get frosts, they go dormant and turn yellow or brown in winter. While dormant, they are more susceptible to damage. If this is acceptable they have the advantage of needing less water, which is often in short supply, and less fertiliser than cool climate grasses.

If you live in a tableland area and want a lawn that stays green all year round, you must use cool climate grasses.

COOL CLIMATE GRASSES

Unlike warm climate grasses, cool climate grasses should not generally be used on their own in a lawn. They are better used in combination with other cool climate grasses. Mixtures of grasses are usually preferred to one grass type because they wear well and are better able to tolerate a diversity of environmental situations.

The exception to this is Bent, which should be used on its own. (Kentucky Blue grass can also be grown on its own but generally is not because it takes a long time to establish.)

Recommended mixtures of grasses are given after descriptions of the individual grasses.

Kentucky Blue grass

Originally from the Temperate Zone of the Northern Hemisphere, Kentucky Blue grass (*Poa pratensis*) is a medium to fine textured grass with deep dark colour and good year-round growth. Its main advantage is that it can creep, unlike most other cool climate grasses, and so it can fill in thin patches that may develop, and it can recover after damage.

Kentucky Blue grass is ideally suited to the colder tableland areas of the State, although it is somewhat slow to establish. It is preferably sown in spring or late summer.

Fine-leaved Perennial Rye grass

Fine-leaved Perennial Rye grass (selected strains of *Lolium perenne*) is a very wear-tolerant, dark green, shiny-leaved grass, with a bunchy growth habit. It is suitable for tableland areas and other colder areas. The seed germinates quickly (3 to 5 days) and can be sown in late summer or spring. It is very useful in seed mixtures. Its shade tolerance is good.

Tall Fescue

Festuca is the old Latin name for a grass. Tall Fescue (*Festuca arundinacea*) is a coarse textured grass (though not as coarse as Buffalo) with a lightish green colour. It can go longer without water than other cool season grasses but after a dry spell it will die off in patches, giving a clumpy appearance. It has good wear, heat and salt tolerance. It needs to be mowed at least 40 to 50 mm high or it will die. Tall Fescue tolerates compaction and has reasonably good shade



5. A Kentucky Blue/Fine Rye lawn in Canberra. The deep green colour is a feature of cool climate grasses.

tolerance. It needs to be seeded at very high rates, for example 2 kg/100 square metres (m^2), or it becomes clumpy.

Tall Fescue is used extensively in backyards in Canberra and has proved successful because of its superior drought tolerance compared with other cool climate grasses. It is less likely to fail in the first summer after establishment than are other cool climate grasses and it requires less fertiliser to keep it in top condition.

Fine Fescues (Chewings and Creeping Red)

Chewings Fescue (*Festuca nigrescens*). This is a dark green grass with fine needle-like leaf blades. Its main advantage is its very good shade tolerance. It can be used under trees in cool areas, where it will compete very well if the mowing height is kept well up. For shaded areas in cooler districts, Chewings can be mixed with ordinary seed mix and sown.

It is not as wear tolerant as Tall Fescue, but recovers well from drought, and in tablelands districts will grow throughout the year. It should be sown densely or it will become tufty.

Creeping Red Fescue (*Festuca rubra*). This is another fine Fescue with much the same characteristics as Chewings Fescue. It is also suitable to use in mixtures.

Bent grasses

Bent grasses (*Agrostis* spp.) are very fine grasses that can produce a very good lawn if you are prepared to put in as much work as is needed to maintain a bowling green. They need careful attention to mowing, fertilising, watering, renovation and disease control. They tend to be more susceptible to diseases and heat stress than other cool climate grasses. The main advantage of bents is that they can produce a perfect bowling green surface because of their ability to withstand continual close mowings.

Bent forms a very dense lawn and produces such a build-up of mat that at least annual renovation is required to reduce it, improve aeration and water penetration, and prevent the lawn from becoming spongy. Bent is very shade tolerant. Most commercial seed, unless otherwise stated, is 'Highland' Bent.

Bent is one cool climate grass that should not be used in mixes with other cool climate grasses.

Recommended grass mixtures

Four parts Kentucky Blue grass to one part Fine Fescue. Sowing rate 2 kg/100 m^2 *. This mixture produces a medium-textured lawn that requires

* 100 square metres (m^2) is an area 10 metres by 10 metres

regular maintenance. It is hard to establish but has good drought tolerance for a cool climate lawn, and requires less fertiliser than most.

One part Kentucky Blue grass to four parts Fine Rye. Sowing rate 3 kg/100 m². This produces another medium-textured lawn that requires regular maintenance. It needs a lot of fertilising and watering but if that is done a high quality lawn results. It is fast growing and green in winter. It takes extra care to establish and must not be allowed to dry out in the first summer.

One part Kentucky Blue grass to three parts Tall Fescue. Sowing rate 3 kg/100 m². This lawn also requires regular maintenance but has a coarse texture. It requires less fertiliser and less water, but it grows faster and therefore needs more frequent mowing and edging. Its main advantages are that it is hard wearing and stands up well to drought and heat. It is, however, a rougher lawn than the other two.

These lawn seed mixtures are available in Canberra and the Southern Tablelands and may be available in other parts of the State.

CLOVERS IN LAWNS

The inclusion of clovers in home lawns is a matter of personal preference. Their main advantage is that they add nitrogen to the soil, and there is undoubted benefit from their inclusion in lawns, especially in cool climates. However, some home gardeners would prefer to add nitrogen by applying fertiliser. Clovers prefer alkaline conditions and do not thrive in acid conditions. Fertilisers with nitrogen in them tend to make the soil more acid, so tend to inhibit clovers.

O'Connor Strawberry clover

O'Connor Strawberry clover (*Trifolium fragiferum*) is the ideal clover for home lawns. It grows sideways through the lawn, has small leaflets and its runners travel through the lawn blending in well with the grass. The flowers are small and less apparent than on other clovers.

White clover

White clover (*Trifolium repens*) shows up everywhere and is easily recognised by its white flowers. It can give the lawn an uneven appearance because it forms in clumps, especially several years after sowing or if it comes up by itself. In peak growth periods the growth of White clover may exceed that of the grass in a lawn, making management difficult. Flowers of White clover tend to attract bees during the flowering season and people may be stung if they are not careful.

If clovers are used in lawn sowing mixtures, one part of clover to ten parts of grass seed (by weight) should be used.

LESS COMMON LAWN GRASSES

Carpet grass (*Axonopus affinis*). Resembles Buffalo but the leaves are softer in texture and lighter in colour. It is often found invading couch lawns. Carpet grass may be useful as a turf grass in warm, frost free areas. Seed is available.

Centipede grass (*Eremochloa ophiuroides*). Resembles Buffalo but has smaller leaves and stems. It is slow growing and sensitive to frost. Seed is not available. Establishment is by runners or turf in spring or summer.

Zoysia (*Zoysia* spp.). A warm climate grass from the tropics with excellent wear tolerance. It is slow growing and frost sensitive. Establishment is by turf only. It is difficult to find commercially.

Durban grass (*Dactyloctenium australe*). Like a soft Buffalo. It is excellent for heavy shade.

OTHER GROUND COVERS

Ground covers such as 'New Zealand' moss (*Sagina subulata*), Lippia (*Phyla nodiflora*) and Mercury Bay 'grass' (*Dichondra repens*) are sometimes used as 'lawns'. These plants are not grasses. Mercury Bay 'grass', or kidney weed, can in fact be quite a weed problem in lawns and garden beds. Such plants are not generally recommended for lawns, although Lippia is a success in some inland districts, especially in alkaline soils. They are generally suited for display areas rather than for walking on, although Lippia can wear well if it is looked after.

SHADY AREAS

Some lawn grasses tolerate shade areas better than others, but all require a good deal of sunlight for satisfactory growth. Lawn grasses planted on the shady side of a fence or building frequently become sparse and overrun with weeds and moss. Similar conditions occur under densely-foliaged, shallow-rooted trees, and the competition from tree roots for moisture and nutrients adds to the problem. Under such circumstances, weedkillers will control weeds and moss, but unless the cause of the shading can be removed, lawn grasses cannot be expected to thrive there for long.

Cool climate grasses such as Chewings Fescue, Bents, Fine Rye and some Kentucky Blue do well in shade provided a lot of fertiliser and water are supplied and the mowing height is kept up.

Another logical solution to such situations is to plant shade-tolerant ground covers such as bugle flower (*Ajuga reptans*), ivy (*Hedera helix*), kidney weed (*Dichondra repens*), Wild Strawberry (*Fragaria indica*) or native violet (*Viola hederacea*).

Alternatively the area might be made into a garden bed that could be planted with shade-tolerant plants.

In areas that receive a lot of wear, paving or mulching may be better than a lawn.

PRE-ESTABLISHMENT

TOPSOIL

Ideally the lawn should be established on a good sandy loam soil. If the soil on the site is not good enough—for example it may be very heavy clay or nearly pure sand—topsoil may have to be brought in. If so, take care in choosing that soil. It should be a sandy loam (more sandy than loamy). Before buying, check that you have the right kind. Squeeze a moist lump in the hand. If it moulds to a shape but falls apart after opening the hand, it is good. If it moulds and stays in that shape, it is not suitable. Another good guide is to inspect the back of the pile (which has not been disturbed) at the point of sale. If it has crusted and set hard, it is not suitable, as it will do the same under your lawn.

If you are buying topsoil, bring in at least enough to cover your lawn area with 100 mm. That topsoil should then be incorporated into the soil on the site. Do not just place it on top of the present soil, as that would create serious problems. If, for example, the subsoil were a heavy clay, and topsoil were placed over it and a lawn grown, the grass would send roots down into the shallow topsoil, but they would stop growing when they reached the hard clay. With only shallow roots the lawn would not thrive, and it would wilt in hot weather as the surface topsoil quickly dried out.

The best way to incorporate the topsoil into the soil on the site is to divide the topsoil in half, then turn the first half into the soil and then the second half. If you do this, the resultant soil will have the highest amount of topsoil at the surface, with it gradually decreasing as the soil gets deeper. This is desirable for good lawn establishment.

CULTIVATION

The amount of cultivation necessary before putting down a lawn depends on the state of the soil. The top 150 to 300 mm should be in a loose, friable condition for best establishment. If the soil is already in this condition, cultivation will not be necessary.

However, if it is not in this condition, some cultivation will be necessary. If the area is small, the soil can be disturbed by hand with a garden fork. If the area is large, then probably the best method is to hire a contractor to chisel plough and rotary hoe the soil.

A word of caution—too much cultivation is bad because it can cause problems later on with soil settling, which disturbs levels. Just loosen the soil enough to let grass roots penetrate it. After rotary hoeing, level, water, level again and lightly roll the soil to get a uniform surface.

Where major landforming has to be done, it is worth removing the topsoil first and re-distributing it when the work is finished.

Cultivate heavy clay soils only when they are just damp—not too dry and not too wet—or the soil structure will be damaged. Take care not to bring up heavy clay subsoil as it will set hard.

On some clay soils (that is those with a high sodium content), gypsum can be used to make the soil more friable. Gypsum should be spread on top of the cultivated soil at the rate recommended on the label. If the soil is also too acidic (see section on pH below), lime can be used instead of gypsum, as it will make the soil more friable and less acidic.

Organic matter (for example animal manure, leaf litter, and compost) will improve any soil, but it is especially good for building up a sandy soil. It should be incorporated at the time of cultivation.

Do not leave the soil bare for long as it dries out rapidly, upsetting the fine balance of soil microbes and earthworms, and it can be washed away by heavy rain.

ACID AND ALKALINE SOILS

Sometimes soil can be excessively acid or alkaline. Virgin coastal soils with a high rainfall tend to be highly acidic. The ideal range of pH* is 5.8 to 6.8. Have the soil tested if a pH problem is suspected. On a very acid soil, add agricultural lime (calcium carbonate) or dolomite (calcium magnesium carbonate). Apply at the rates listed in the accompanying table. The quantities seldom need be greater because most grasses prefer a slightly acid soil.

Alkaline soils are less commonly encountered. For soils that are neutral or only slightly alkaline (say pH 7.5), adding 25 to 100 g of agricultural sulphur per square metre (and preferably turning it in) should bring the pH of the top 10 cm to between 6.0 and 6.5. For a sandy soil, use 25 g; for a clay soil, use 100g; for a loam, somewhere between.

For soils that are more alkaline (say greater

* see glossary

Table 2. Amount of lime needed to bring pH to an optimum level (kg/100 m²)

pH	7.0–6.5	6.0	5.5	5.0	5.0–4.5
sands and sandy loams	0	0	12	24	36
loams and clays	0	0	17	36	50

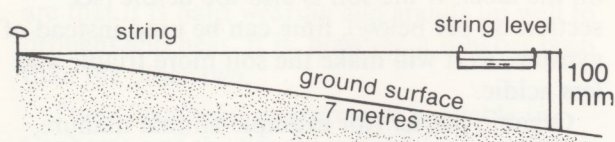
For example, for a clay soil with pH 5.0, add 36 kg of lime/100 m² to bring the pH up to an optimum level.

than pH 7.5) it becomes very expensive to bring the pH down.

Some fertilisers (for example sulphate of ammonia, urea and ammonium nitrate) and all forms of organic matter (for example peat and manure) also acidify the soil but take a long time. Agricultural sulphur is the cheapest and most commonly used material. Sulphur takes 6 to 8 weeks to act in summer and perhaps double this in cooler weather.

DRAINAGE

Good drainage is essential for a healthy lawn. First and foremost, surface water must be able to get away after rain. To achieve this, the lawn must have a slope of at least 1 in 70. Most land will already slope at least that much.

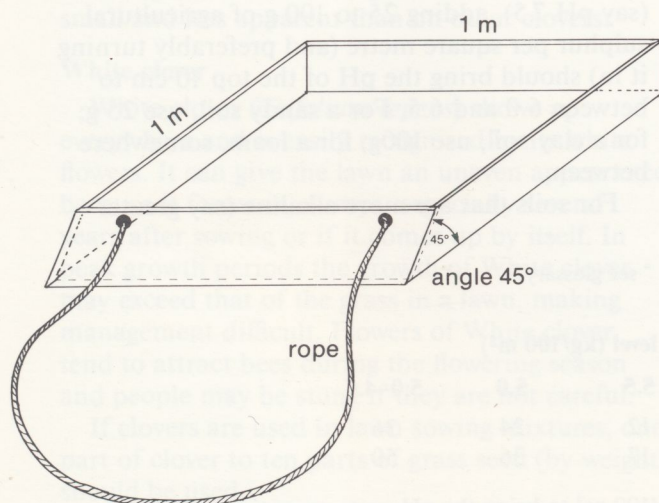


How to measure a slope (here its 1-in-70) using a string level. Lawns should have a slope of at least 1-in-70 to ensure proper drainage.

Land not sloped will develop wet spots. Walking on those wet areas will then compact the soil, making it very hard for grass to grow. The only exception to this is a sandy soil that drains very quickly by itself.

In some situations, underground or run-off water may cause drainage problems. For a discussion on this, see the section 'Problems in lawns' at the end of the Agfact.

A large timber box with a leading edge for surface levelling. (Made from 150 mm x 50 mm Oregon timber. Oregon is ideal because it is light but durable.)



GRADING AND LEVELLING

Final surface grading is best left until just before seeding or laying turf. The surface should be even because high spots invite 'scalping' by the mower, and low spots accumulate water. Where the slope is too great, a split level may be the answer.

To produce a level surface from a sloping or undulating site, first use string lines and fill any hollows. Then drag a heavy instrument across the site. Either use a 'Levelawn'® or build a large timber box with a leading edge (see diagram). Drag it across the site several times. It will slice off humps and fill in hollows. After several passes you will have a fairly even site. Finally rake the surface to create a fine crumbly-textured topsoil suitable for sowing or turfing.

FERTILISER DRESSING FOR THE SITE

Before sowing or laying turf, dress the site with a fertiliser. Use either:

- pulverised poultry manure, or blood and bone, at 2 to 3 handfuls to the square metre (m^2) or
- a pelleted fertiliser with an N:P:K* ratio of 10:4:6 or thereabouts. Apply at 4 kg/100 m^2 .

Also add superphosphate at 3 kg/100 m^2 .

Rake the fertiliser lightly into the soil surface before starting to sow or turf.

LAWN ESTABLISHMENT

Lawns can be established by laying turf, planting runners or sowing seed.

LAYING TURF

Laying turf is the quickest and most convenient way to get a lawn. Warm climate grasses are usually turfed. Cool climate grasses are not usually turfed, but some turf is available around large centres such as Canberra.

Turfing is excellent if you need to cover steep slopes which might otherwise erode while you wait for runners or seed to provide cover. It is also good for small areas and better than runners or seed where floor coverings may be ruined by trafficking of loose soil.

Before laying turf try to ensure that the soil is free from oxalis (*Oxalis* spp.), onion weed (*Nothoscordum inodorum*), onion grass (*Romulea rosea* var. *australis*) and nut grass (*Cyperus rotundus*). These weeds are not easily controlled once the turf is laid.

Turf is available most commonly as machine-cut rolls. It should be of even thickness—20 to 30 mm is usual.

* see glossary

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7. The soil surface should be levelled just before laying turf

Two grades of turf are usually available—cultivated and uncultivated.

Cultivated turf is produced in much the same way as any other agricultural or horticultural crop.

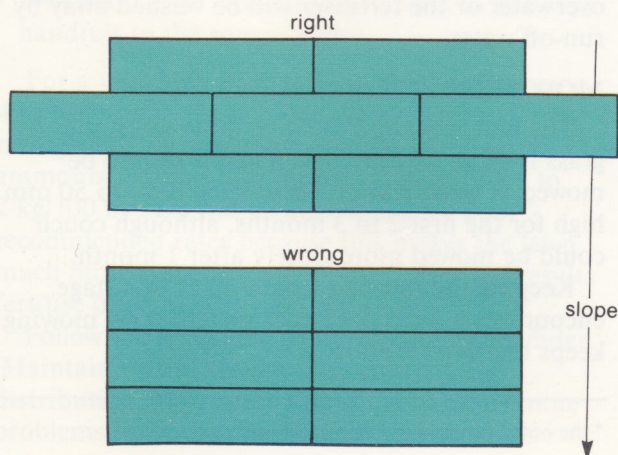
Uncultivated turf or paddock turf is largely taken from a pasture paddock or similar area where there is a natural dominance of a single grass species, commonly couch or Kikuyu. The quality of this turf is inferior to cultivated turf and you can expect lots of weeds and generally poor cover, but the price is lower. In general, you get what you pay for.

Order turf to arrive as close as possible to the time of laying. Remember it is living grass cut off from much of its root system and so needs to make contact with the soil again quickly. If it has to stand for any length of time, keep it cool and moist.

Put the rolls on firm, moist soil with their edges firmly pushed together. Lay them across a slope, not down it, to minimise soil erosion from rain. Place them in a chequerboard pattern (see diagram). Lightly roll them, and water well.

Planting time for turf. Turf of the warm climate grasses couch, Buffalo, Kikuyu and so on is best

Correct placement of turf: rolls are laid across the slope in a chequerboard pattern



planted in the period from October to February as that is when it makes most growth. In warm coastal districts you can plant it at any time of the year, though it won't make much growth through the colder months.

PLANTING RUNNERS

Grass runners or 'sprigs' can be an economical means of lawn establishment. With reasonable attention to watering and fertilising, you can get a good cover by this method in 12 to 14 weeks. Couch, Queensland Blue couch, Buffalo and Kikuyu can be established by runners.

Runners are first cut into 100 to 150 mm lengths and then placed in a box or bag. Keep them moist during preparation and planting by watering or covering them with a wet bag.

With a rake or chipping hoe open furrows about 50 mm deep, put the runners in, then cover them with soil. Or plant the runners individually. Leave some foliage above soil level, especially in the case of Buffalo.

Plant in rows 300 mm apart, with 300 mm between runners. (For quicker coverage, plant closer together.)

Plant runners in moist soil, and water in. Regular watering is essential, especially through the first weeks.

Planting time for runners. Same as for turf, see above.

A grass runner will quickly produce roots after planting



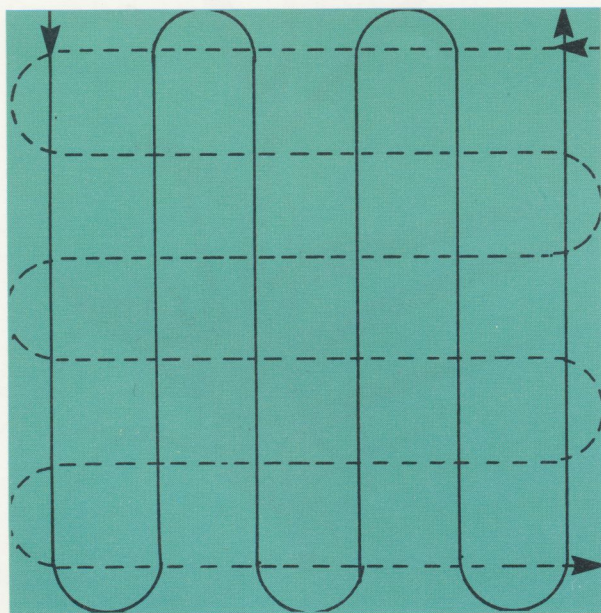
SOWING SEED

The seed of lawn grasses is very small, so it is easy to get a poor distribution. To avoid this, follow these instructions carefully:

- Divide the quantity of seed in half.
- Mix the seed with an equal or greater quantity of sand, soil, sawdust or other suitable dry matter. This gives the mixture bulk which allows for more even distribution and makes it easier to see where you have been.
- With the first half sow the entire area in a lengthwise direction. Then sow the entire area in the crosswise direction (see diagram). For fine seed, make a shaker by punching holes in the lid of a big jar and use this for sowing. Coarser seed, for example Fine Rye, is harder to sow this way.
- Cover by light raking and roll to ensure good contact between seed and soil.

Moisture care. Never allow the surface soil to become dry in the after-sowing period, otherwise germination will be poor. How much and how often to water the sown area will depend on soil type and the weather. During hot or windy weather you may have to sprinkle the area four or five times a day. The best way of watering a newly sown area is with 'impact arm' or 'wave' type sprinklers because they have a low but even precipitation rate. Do not water any spot long enough for water to glisten and start to run off. Move the sprinkler frequently to prevent pools forming or seed washing into patches. If you can't be home to water this frequently, a straw or hessian cover over the soil will help to keep it damp on the surface.

For even distribution of seed when sowing a lawn, sow half the seed in a lengthwise direction and the other half in a crosswise direction. Fertilise in the same way.



Seed rates and sowing times. Sow seed at the rate specified on the label. Warm climate grasses can be sown at any time from October to February. Cool climate grasses can be sown in February–March. In cool areas they can also be sown in August–September.

Seed of Bent grass will usually germinate in 7 to 10 days. Couch may take 3 to 4 weeks, although hulled* seed germinates in about half this time, and seed specially treated ('Carbactivated') to germinate very quickly is now available.

MAINTAINING THE NEW LAWN

The new lawn needs special care. It has a shallow root system which means it can only get water and nutrients from the thin surface layer of the soil. During hot, dry weather the surface layer quickly dries out and consequently the new lawn becomes stressed. If it stays hot and dry for long enough the lawn may die.

Aim to get a good, deep root system established as quickly as possible. The energy to make roots comes from the leaf blades, so it is important to keep plenty of leaf on the lawn at this stage.

FERTILISING

For turf, fertilise 4 weeks after laying or at the first mowing. For seed, fertilise 4 weeks after grass emerges. Use a pelleted fertiliser with an N:P:K of 10:4:6 or similar. Apply at 3 kg/100 m². Repeat the application at 6 to 8 week intervals during the growing season.

Most people tend to over-fertilise. To avoid this, first measure the area to be fertilised. Then weigh out the amount of fertiliser needed for that area, at the rate of 3 kg/100 m².

Divide the fertiliser in two halves, mix dry sand with it and follow the same technique outlined for seed sowing. It is best to use a good fertiliser spreader that will allow you to choose the setting needed to apply the fertiliser evenly.

Follow up the application of fertiliser with a light watering to avoid burning the grass. Don't overwater or the fertiliser will be washed away by run-off water.

MOWING

The first mowing should be done when the grass is 40 to 50 mm high. Then it should be mowed at weekly intervals to keep it 40 to 50 mm high for the first 2 to 3 months, although couch could be mowed more closely after 1 month.

Keeping the mowing height up at this stage encourages a good deep root system. Low mowing keeps the roots shallow.

* the outer covering or 'skin' removed

Later mowings can be at a lower height, but remember that cool climate grasses should never be mowed lower than 30 mm.

WATERING

When watering the new lawn, give it enough water to wet it to a depth lower than the root zone, and then leave it as long as possible without watering. This encourages the roots to go deeper and conditions the lawn to tolerate dry spells.

Watering frequently and moderately is bad for the lawn because it encourages a shallow root system, making the lawn easily stressed by heat.

There are no hard and fast rules as to how often and how much a lawn should be watered. Soil type, prevailing weather and type of grass all affect the issue. Shallow sandy soils dry out more quickly than deep clay soils and so demand more frequent, shallower watering. Cool climate grasses are less tolerant of dry conditions than are warm climate grasses.

When watering, ensure moisture reaches a soil depth of 20 to 30 cm. Inspection by removing a plug or wedge of turf is helpful in deciding whether enough water has been given. Move the sprinkler often enough to prevent surface run-off and water wastage.

MAINTAINING THE ESTABLISHED LAWN

FERTILISING

There can be a gradual loss of nutrients from the soil when lawn clippings are removed and these nutrients need to be replaced by fertiliser. Different grasses need different amounts of fertiliser. Cool climate grasses generally need more fertiliser than warm climate grasses and need a minimum of two applications a year. Some grasses such as Buffalo may require very little fertiliser once established. But if fertilised, wear tolerance, colour and vigour are improved.

If you are fertilising only once or twice a year use either:

- a pelleted fertiliser with an N:P:K of about 10:4:6 at 4 kg/100 m², or
- fowl manure or blood and bone at 2 to 3 handfuls to the square metre.

For a very high quality lawn, also fertilise every 4 to 6 weeks in the growing season with a nitrogenous fertiliser (for example sulphate of ammonia, ammonium nitrate or urea) at 1.5 to 2 kg/100 m². Do not fertilise at higher than recommended rates because this makes the lawn much more susceptible to disease. For best results fertilise often at very light rates.

Follow the spreading procedure outlined under 'Maintaining the new lawn' to ensure even distribution. Poor spreading is the cause of more problems on lawns than almost anything else.

Generally, the best time to fertilise is while the grass is actively growing because that is when fertiliser can be used. Fertilise warm climate grasses in spring and summer; fertilise cool climate grasses from autumn right through winter to spring. (In fact, cool climate grasses can be fertilised all year round if desired. Warm climate grasses may also benefit from a light dressing in late autumn and early spring.)

Nitrogenous fertilisers, especially the ammonia types, increase soil acidity but will only adversely affect growth of the grass after they have been used for a long time. Check the pH of the soil if a problem is suspected. To overcome excess acidity, apply lime or dolomite at 10 kg/100 m².

MOWING

Mow regularly, but not too low. Remove not more than one-third of the leaf height per cut. The lower you cut, the more frequently you have to mow.

Optimum mowing heights

Buffalo should be cut at a height of 30 to 40 mm. Couch and Bent should be cut no lower than 15 mm. Kikuyu should be cut at least weekly in the growing season at a height of 20 mm. If cut more frequently it will have a finer finish with more leaf and less stalk. If cut higher it will rapidly become spongy.

Cool climate lawns except for Bent (that is Kentucky Blue, Fine Rye, Fine Fescue and Tall Fescue) should be cut at 40 to 50 mm.

The lower the cut the shallower the root system, and a shallow root system makes the grass more susceptible to damage in dry periods. Raise the cutting blade a little as the growing season draws to an end, and do not lower it again until regrowth commences.

If grass has been allowed to get too long do not cut it down to normal height in one cut. Particularly if done in summer, this results in badly scorched grass that may take several weeks to recover. It is better to reduce the height of the grass a little at each cutting until the normal height of cut is reached.

Provided regular cutting is done, removal of clippings is not of great importance. (However, during an attack by a disease, it is advisable to collect and burn the clippings.) If clippings are not removed, they will return to the soil as organic matter, and less fertiliser will be needed. Lastly, it is always easier to mow when the grass is dry.

WATERING

Water infrequently and deeply. This forces the roots to reach down to where there is more water, making a stronger lawn that can better withstand dry periods. It is better to water very heavily once a week than lightly every night. Good, steady rain that doesn't run off the top does this job perfectly.

Only ever let the sprinkler water to run-off point, and then shift it. Come back later and water that spot again to make sure the water gets down into the soil. Automatic timers on taps and sprinklers that move themselves are very useful aids for this.

Clay soils take longer to wet, hold more water and take longer to dry out than sandy soils. So a clay soil needs more water, but less frequent watering, than a sandy soil.

Sprinklers. Use one with a reasonably low output and an even distribution. *Choice* magazine did a review of sprinklers in their February 1983 issue. They found that oscillating sprinklers were the best, followed by the impulse and mobile types. For more information see this issue of *Choice*. Automatic timers on taps are a great help because they 'remember' to turn off the water.

TOP DRESSING

Normally, top dressing should only be done to change levels. It should not be done annually. Some thatchy grasses such as Buffalo may, however, benefit from occasional top dressing. For details, see 'Depressions in the lawn' in the section on 'Problems in lawns'.

PROBLEMS IN LAWNS

RENOVATION

If a lawn needs renovation, do the work when the grass is growing vigorously so it can immediately start recovering.

A common fault is insufficient attention to soil preparation before planting. There are no substitutes for good drainage and soil preparation.

Complete reconstruction may be necessary to provide drainage, or major changes in levels, or if the grass is particularly sparse or weed-ridden. If complete reconstruction is necessary, kill the whole lawn by spraying with glyphosate (for example Zero ® or Roundup ®), and carefully remove the old lawn so as to disturb the levels as little as possible. In establishing a new one follow the directions given in the section 'Pre-establishment' and 'Establishment'. The glyphosate sprayed on the old lawn will not affect the new one, as long as it is used at the recommended rate.

BARE PATCHES OR DEAD LAWN

Bare patches can occur where the grass has been mowed too low, or allowed to dry out, or trampled or for other reasons. To renovate these areas, first dig deep furrows in the soil. The lawn edger is the ideal tool for this. Then sprinkle seed or plant runners into the grooves, and water them in.

Do not try to renovate bare patches by spreading topsoil over the area and planting seed or runners into that. The roots will grow down through the topsoil but stop when they reach the bare ground, and the grass will never establish properly.

THATCH

Grasses such as couch, Buffalo and Kikuyu tend to develop a thick 'mat' or thatch. This mat, mainly thick layers of old runners, makes the lawn spongy and also retards the entry of water, air and fertiliser.

Remove the mat or thatch with a dethatching machine, which has vertical blades that work through the layers. The machine can be hired, or you may find contractors who will do it. Don't try mowing low on Buffalo to get rid of thatch or you will kill the grass. For cool climate grasses, after the dethatching procedure, treat as for bare patches by running grooves through the soil, sowing seed in the grooves and watering thoroughly. Finally, spike the lawn with a fork or spiking machine to improve aeration.

COMPACTED SOIL

Constant traffic on lawns compacts the soil and compaction retards grass growth. To overcome this problem, crack and lift the soil with a garden fork to loosen it. Turning organic matter into the soil at the same time will help strengthen the soil structure. Another method is to soak the lawn thoroughly and then go over it with a coring machine (which can be hired). Give the lawn a light dressing of fertiliser to encourage growth.

DEPRESSIONS IN THE LAWN

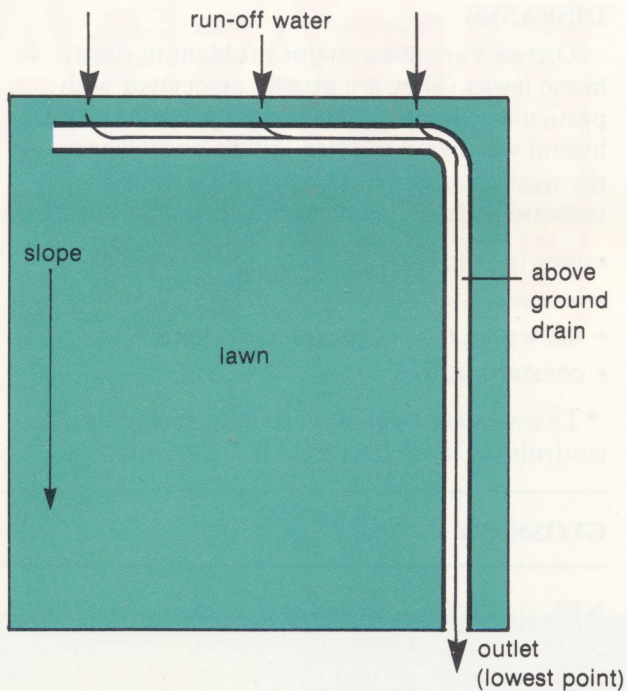
Top dressing can be used to fill in shallow depressions and cover surface runners. The top dressing soil should be similar to the type of soil you have already or slightly sandier. It should be dry and free of weed seed. (Wet soil cannot be spread or rubbed-in easily.) Spread the soil with a shovel and rub it into the grass with a dummy rake or the back of a garden soil rake.

Do not bury the grass with top dressing soil as this will retard growth and may even kill the grass. After the rubbing-in, the grass should be just showing through the soil. If the surface needs heavy treatment, make several light applications at intervals of 7 to 10 days.

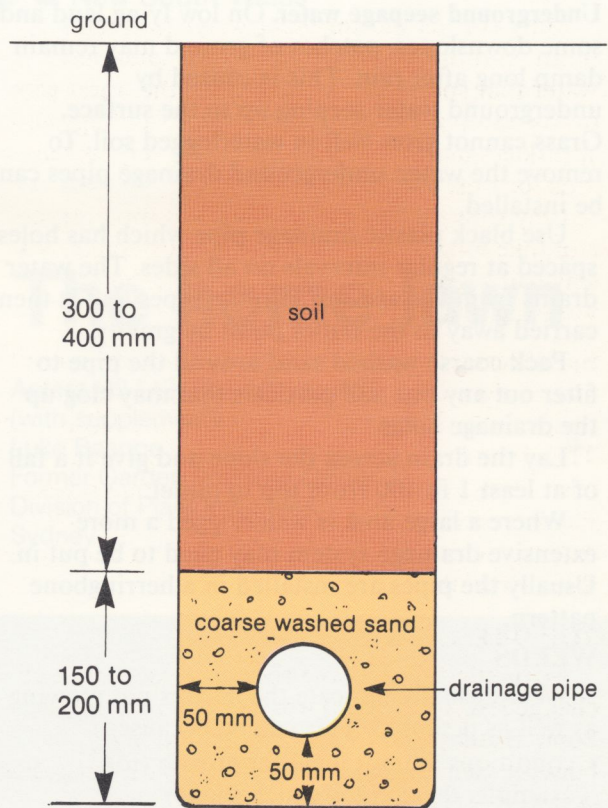
DAMP AREAS

Run-off water. If run-off water is causing problems by running across a lawn, an above-ground drain to divert the water may solve the problem. The drain can be made from half-round terracotta pipe or it can be a shallow drain dug directly into the lawn and surfaced with grass, wide enough for a mower if desired. Give the drain a fall of at least 1 in 70 to make the water flow.

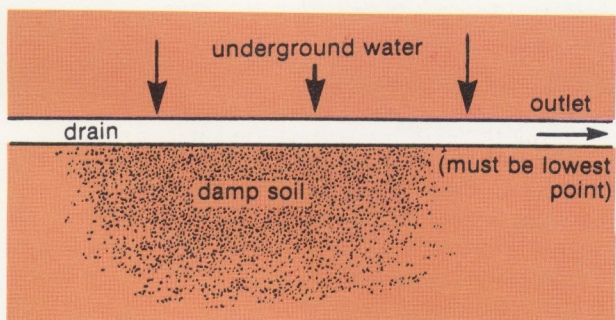
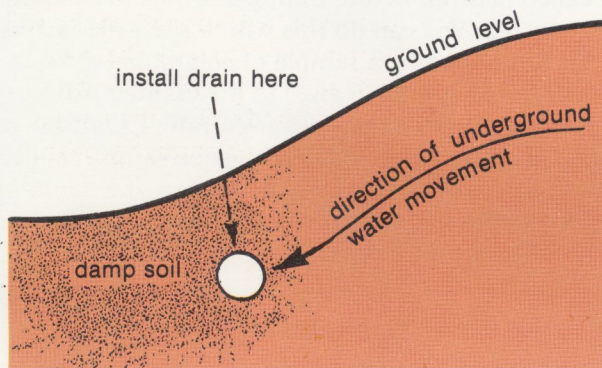
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An above-ground drain can be installed to prevent problems caused by run-off water

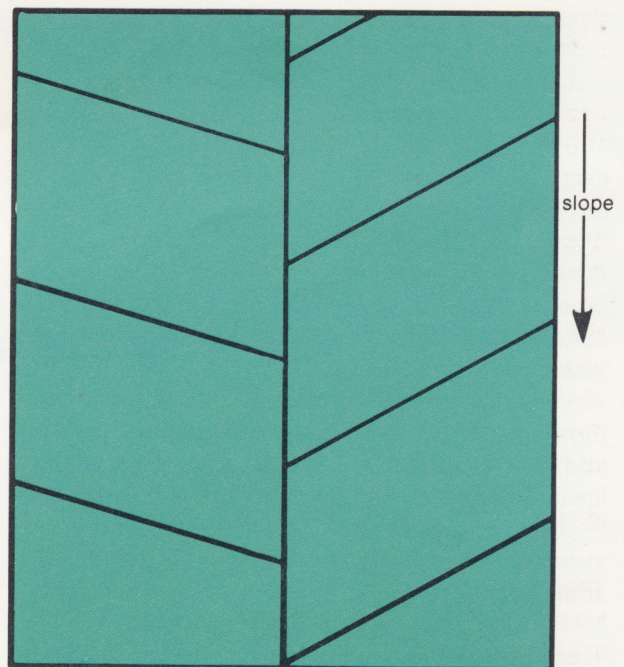


Cross-section of correctly laid pipe. Note the coarse washed sand packed around the pipe.



(Top) Underground drain: cross-section. This type of drain can be used to remove water from low lying areas.

(Bottom) Underground drain: top view. The pipe is laid across the slope and should have a fall of at least 1 in 100.



In an extensive underground drainage system the pipes are usually installed in a herringbone pattern

Underground seepage water. On low lying land and some downslopes, patches of ground may remain damp long after rain. This is caused by underground water seeping up to the surface. Grass cannot grow well in waterlogged soil. To remove the water, underground drainage pipes can be installed.

Use black plastic drainage pipe which has holes spaced at regular intervals on all sides. The water drains from the wet soil into the pipes and is then carried away to the outlet point by gravity.

Pack coarse washed sand around the pipe to filter out any fine soil particles that may clog up the drainage holes.

Lay the drain across the slope and give it a fall of at least 1 in 100 from top to outlet.

Where a large area is waterlogged a more extensive drainage system may need to be put in. Usually the pipes are installed in a herringbone pattern.

WEEDS

Weeds usually indicate the lawn is not growing as well as it should. This can be because:

- conditions are not ideal for growth (for example, there is too much shade)
- inadequate fertiliser is being used
- the wrong type of grass has been used
- the grass has been mowed too low.

See the supplement for a short list of the more common weeds and their control.

PESTS

While most insects are quite harmless or even beneficial in the lawn, some can cause damage. The main culprits are grass-eating caterpillars and the African black beetle (*Heteronychus arator*).

The caterpillars, lawn armyworm (*Spodoptera mauritia*) and sod webworm (*Herpetogramma licarsisalis*), appear sporadically in late summer and autumn. They eat the leaves usually in the evening and night, and hide under the grass in the day. As infestations develop, the older caterpillars frequently become concentrated along 'fronts' as they advance. Very heavily infested grass turns brown and looks dead. The caterpillars may be controlled by spraying the lawn with a suitable insecticide.

The African black beetle, when it appears, is more of a problem on badly looked after lawns, and can be present in large numbers on a healthy lawn without causing much ill-effect. The larvae feed on the grass roots during summer and autumn (particularly December–February). The adult beetles may also cause irregularities on the lawn surface by emerging and burrowing. Treatment with a suitable insecticide at the first sign of adult activity in September or October should give protection for some months.

Pests are treated more fully, including controls, in the Agfact P6.AE.1 *Pests of turf*.

DISEASES

Diseases are not a major problem in most home lawns. They are usually associated with particular climatic conditions, for example hot, humid weather, and often will go away when the weather changes. Disease in the lawn can indicate faults in lawn culture such as:

- mowing too low
- too much fertiliser
- the wrong type of grass for the area
- constant traffic.

Diseases are treated more fully, including controls, in the Agfact P6.AB.1 *Turf diseases*.

GLOSSARY

NPK stands for nitrogen (N), phosphorus (P) and potassium (K). These are the most important plant nutrients, in that order. A complete fertiliser contains all three in a certain proportion called its NPK ratio. A lawn needs a complete fertiliser in much the same way as people need a balanced diet.

pH is a measure of acidity or alkalinity of soil, water etc. The pH scale is from 0 to 14. Below 7 is acidic, above 7 alkaline. Values around 7 are called neutral. Before liming a soil its pH should be tested. You can do this with a good pH-testing kit or by sending a sample of soil (about a margarine container size) to the Garden Advisory Service, Department of Agriculture, P.O. Box K220, Haymarket, 2000. To take a sample, collect soil from several parts of the garden at a depth of 70 to 100 mm, mix them together, and take about a 500 g sample from that.

FURTHER INFORMATION

For further information contact your nearest Department of Agriculture horticulturist.

Related Agfacts include:

P6.AB.1 *Turf diseases*

P6.AE.1 *Pests of turf*

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